

Chapter 1

History of Chinese Inventions. The

Present and the Future.

China as a nation has the longest and by far the most vast record of inventions in the history of the world. It is now reliably estimated that more than 60% of all the knowledge existing in the world today originated in China, a fact swept under the carpet by the West.

Joseph Needham, a British biochemist, scientific historian, and professor at Cambridge University, is widely rated as one of the most outstanding intellectuals of the 20th century. Chinese students visiting at Cambridge repeatedly informed him that Western scientific methods and discoveries discussed in his classes originated in China centuries before. Needham was so intrigued that he became fully fluent in Chinese, then travelled to China to investigate. He discovered voluminous evidence of the truth of those claims and decided to remain in China to write a book to document what he deemed a discovery of great importance to the world. Needham never completed his task of cataloguing the history of Chinese invention. His one book became 26 books and he died in 1995, with his work still continued today by his students. One good introduction to this topic is Robert Temple's summary of Needham's work. (1)

We were all taught in school that the printing press with movable type was invented in Germany by Johannes Gutenberg in about the year 1550. Not so. China not only invented paper but also the printing press with

movable set type, which was in common use in China 1,000 years before Gutenberg was born. Similarly, we were taught that Scotsman James Watt invented the steam engine. He did not. Steam engines were in widespread use in China 600 years before Watt was born. There are dated ancient texts and drawings to illustrate and prove the Chinese discovered and documented “Pascal’s Triangle” 600 years before Pascal copied it, and the Chinese enunciated Newton’s First Law of Motion 2,000 years before Newton.

The same is true for thousands of inventions that the West now claim as theirs but where conclusive documentation exists to prove that they originated in China hundreds and sometimes thousands of years before the West copied them. It was not for nothing that Marco Polo is described in China as “Europe’s great thief”. The next few paragraphs are adapted mainly from information in Temple’s book, which I strongly recommend.

The Chinese invented the decimal number system, decimal fractions, negative numbers, and the zero, so far in the past that the origin is lost in the mists of time. The Chinese tracked sunspots and comets with such detail and accuracy that these ancient records are still used as the basis for their prediction and observation today. The Chinese were drilling for natural gas about 2,500 years ago, wells 4,800 feet deep, with bamboo pipelines to deliver the gas to nearby cities. The Chinese pioneered the mining and use of coal long before it was known in the West. Marco Polo and Arab traders marveled at the “black stone” that the Chinese mined from the

ground, that would burn slowly during an entire night.

China had printed paper money almost 1,500 years ago, done in ways to prevent counterfeiting. Wrapping paper, paper napkins and toilet paper were all in general use in China 2,000 years before the West could produce them. They were the first to invent and develop a full mechanical clock with a true escapement, many centuries before the Swiss had done so. The Chinese invented an ingenious seismograph still in use that tells not only the severity but the direction and distance of earthquakes. The Chinese invented hot-air balloons, the parachute, manned flight with kites, the wheelbarrow and matches. They invented hermetically-sealed laboratories for scientific experiments. They invented belt and chain drives, the paddlewheel steamer, the helicopter rotor and the propeller, the segmental-arch bridge. They invented the use of water power and chain pumps, the crank handle, all the construction methods for suspension bridges, sliding calipers, the fishing reel, image projection, magic lanterns, the gimbal system of suspension. China not only invented spinning wheels, carding machines and looms, but was the world's leader in technical innovations in textile manufacturing, more than 700 years before Britain's 18th century textile revolution.

Chinese expertise with fine porcelain was so advanced millennia ago, that even today it is admitted their ability has never even been equaled in the West, much less surpassed. The Chinese discovered not only magnetism but magnetic remanence and induction, as well as the

compass. They invented gunpowder, smoke bombs, the cannon, the crossbow, plated body armor, fireworks, flamethrowers, grenades, land and sea mines, multi-stage rockets, mortars and repeating guns. China had irrigation canals that were also used for transport, and the Chinese invented the canal locks that could raise and lower boats to different levels 1,500 years before the Americans built the Panama Canal. China has earthquakeproof dams functioning today that were built around 250 BC.

A 52-volume Chinese Traditional Herbal Medicine encyclopedia. A millennium ago, the Chinese conceived and developed the science of immunology – vaccinating people for diseases like smallpox, knowing how to extract and prepare the vaccine so as to immunise and not infect. They discovered the circadian rhythm in the human body, blood circulation and the science of endocrinology. The Chinese were using urine from pregnant women to make sex hormones 2,000 years ago, understanding how they acted on the body and how to use them. Many centuries-old Chinese medical books still exist, documenting all this and much more. Around 1550, China compiled a huge 52-volume Chinese Traditional Herbal Medicine encyclopedia that described almost 2,000 herbal sources and 10,000 medical prescriptions. Among them is chaulmoogra oil, which is still the only known treatment for leprosy. China designed and built the world's largest commercial ships, which were many times longer and ten times larger in volume than anything the West could build at the time. In the late 1500s the largest English ships

displaced 400 tons, while China's displaced more than 3,000 tons. Western ships were small, uncontrollable and fragile, and useless for travelling any distance. Thousands of years ago, Chinese ships had watertight compartments that permitted them to continue journeys even when damaged. Moreover, Chinese ships not only had multiple masts, but China invented the luff sails which permit us to sail almost into the wind, just as sailboats do today, and were therefore not dependent on wind direction for their travel. Their luff sails contained sewn-in bamboo battens that keep the sails full and aerodynamically efficient, as racing sailboats use today. The Chinese invented the ship's rudder – something the Europeans never managed to do, able to steer themselves only with oars, and European sails permitted them to travel only in the direction of the wind, which meant a ship would have to remain in place, sometimes for months, awaiting a favorable wind.

Chinese maps were the best in the world, by orders of magnitude, for more than a millennium, and the precision of their maps became legendary, being far in advance of the West. The Chinese invented Mercator projections, relief maps, quantitative cartography and grid layouts. China had compasses and such extensive astronomical knowledge that they always knew where they were, could plot courses and follow them by both compass and star charts, and could sail wherever they wanted, regardless of the wind direction. As Needham pointed out, China was so far ahead of the Western world in sailing and navigation that

comparisons are just embarrassing. It was only when the West managed to copy and steal China's sailing and navigation technology that it was able to begin travelling the world and colonising it. James Petras wrote, "It is especially important to emphasize how China, the world technological power between 1100 and 1800, made the West's emergence possible. It was only by borrowing and assimilating Chinese innovations that the West was able to make the transition to modern capitalist and imperialist economies." (2) China was 1,000 years ahead of the West in anything to do with metals – cast iron, wrought iron, steel, carbon steel, tempered steel, welded steel. The Chinese were so skilled at metallurgy they could cast tuned bells that could produce any tone. Long before 1,000 A.D., China was the world's major steel producer. I believe it was James Petras who noted that in about 1,000 A.D. China was producing about 125,000 tons of steel per year, while 800 years later Britain could produce only 75,000 tons. (1) The Chinese invented the blast furnace, the double-action bellows to achieve the necessary high temperatures for smelting and annealing metals. They invented the manufacture of steel from cast iron. They excelled in creating metallic alloys, and very early were casting and forging coins made from copper, nickel and zinc. The entire process of mining, smelting and purifying zinc, originated in China. The Chinese developed the processes of mining itself, and the concentration and extraction of metals. China was highly advanced in agriculture, having invented the winnowing fan and the seed drill, making an easy process of tilling, planting,

and harvesting. Europeans and Americans were still seeding crops by scattering grain from a bag, a greatly wasteful practice that necessitated saving 50% of each year's crop for seed. China developed scientifically efficient plows that have never been equaled and are still used all over the world today. They invented and developed animal harnesses and collars that first permitted horses to actually be used to pull loads. Europe had no efficient plow, and their only way of harnessing animals was to put a rope around their necks, which succeeded only in the animals strangling themselves. The Chinese invented saddles and the riding stirrup. China's food production was orders of magnitude ahead of the world for more than 1,000 years, its advances in agriculture the enabling cause of Europe's agricultural revolution that first permitted it to begin feeding itself adequately. The Chinese were wearing fine silk and cotton clothing and using toilet paper while centuries later Europeans were still wearing animal skins.

Armillary sphere at the Shanghai Science and Technology Museum
Few people in the West are familiar with China's Armillary Spheres. These wonders of the world, cast in bronze several meters in diameter and beautifully decorated with dragons and phoenixes, are some of the oldest and most accurate astronomical observatory instruments in existence, some created more than 3,500 years ago when the Western countries had no knowledge of such things. They determine and measure the positions and equatorial ecliptic and horizontal coordinates of celestial bodies, the

positions and daily motions of 1,500 stars and constellations, and much more. When the Western Forces invaded China in the late 1800s, they were so captivated that they plundered most of these treasures and the centuries of data from the ancient observatories, disassembling the instruments and removing them to Europe, returning some to China as part of the Treaties after the First World War.

It leaves one speechless to learn the vast extent of Chinese inventions that existed hundreds of years and often millennia, before they appeared in the West. Needham published not only ancient Chinese texts that can be accurately dated, but photos of old drawings that clearly depict all of these items. This isn't a simple matter of gunpowder and fireworks, but of discovery that encompasses the entire range of human knowledge, all of which has been consciously hidden from the Western world. Needham made his discoveries in the 1940s, but neither Western education nor the media have ever referenced or acknowledged them. These are not mere claims; the evidence is conclusive and available for examination but the West has thoroughly erased China from the world's historical memory.

Western historians have distorted and ignored China's dominant role in the world economy until about 1800. There exists an enormous amount of empirical data proving China's economic and technological superiority over Western civilization for the better part of several millennia. Given that China was the world's supreme technological power up to about

1800, it is especially important to emphasize that this is what made the West's emergence possible. It was only by copying and assimilating Chinese innovations and China's much more advanced technology that the West was able to make the transition to modern capitalist and imperialist economies. Until then, China was the leading trading nation, reaching most of Southern Asia, Africa, the Middle East and Europe. China's innovations in the production of paper, book printing, firearms and tools led to a manufacturing superpower whose goods were transported throughout the world by the most advanced navigational system. Moreover, banking, a stable paper money economy, excellent manufacturing and high agricultural yields resulted in China's per capita income surpassing that of Great Britain until about 1800.

Not only this but, as James Petras pointed out, "... the majority of western economic historians have presented historical China as a stagnant, backward, parochial society, an "oriental despotism"." China was never thus. During the 13th century, Marco Polo described China as vastly wealthier and more advanced than any European country, and leading European philosophers such as Voltaire looked to Chinese society as an intellectual exemplar, the British notably using China as their model for establishing a meritocratic civil service. (3)

A first thought when reviewing this research is that the world must have seemed very primitive to China 500 years ago, truly "third world" at the time. When Zhang He and others conducted their voyages of exploration, they

must have been disappointed in what they found. The rest of the world had no paper or printing, no mathematics, no science, little medicine of note, almost no metallurgy to speak of, a most primitive agriculture, no manufactures of any worthy kind, no porcelain, no spinning wheels or weaving looms to make clothing. From reviewing the history of Chinese invention, one develops an increasingly strong feeling the Chinese looked at the world and found nothing of interest in all those societies that were centuries, and in some cases millennia, behind China in almost every way. One can easily theorise this is the reason China closed itself off from the world at that time, concluding that other nations were so backward that little would be gained from prolonged contact. One can imagine they returned home and closed the door, perhaps planning to return in another 500 years to see if things had progressed. With the addition of detail, this is most likely how events transpired.

What China didn't expect, was the West stealing all these ideas, turning them into weapons of colonisation and war, returning to the nation that was the source of that knowledge, and invading it to colonise, to steal resources, and to enslave and massacre the population. China's interest was always only exploration and trade. The Chinese were never expansionist or warlike, wanting only to protect their own borders from invasion from the North. China was quite unprepared for the violent nature and savage brutality of the White man who sailed the world, invoking his God's blessing on his countless atrocities. Coupled with a weak domestic

government and the inventiveness of the Baghdad Jews in using opium to reap billions while enslaving a nation under the protection of the British military, we have the severe downward swing for 200 years.

Two Great Historical Tragedies

China's Summer Palace, the Yuanmingyuan.

The above summary doesn't even begin to adequately catalog of the extent of Chinese invention, of the sum of China's discoveries and contributions to the modern world. But unfortunately, much of China's total sum of knowledge and history of invention is lost to the world forever. A large part of the recorded knowledge of China's history was destroyed in one of the greatest acts of cultural genocide in the history of the world – the looting and burning of China's Summer Palace, the Yuanmingyuan, which contained more than ten million of the finest and most valuable historical treasures and scholarly works from 5,000 years of Chinese history. What could not be looted was destroyed, and the entire massive palace burned to the ground. This wanton theft and utter destruction of one of the world's greatest collections of historical knowledge was engineered by the Rothschilds and Sassoons in retaliation for Chinese resistance to their opium. (4)(5)

This is an aside, but the destruction of the Yuanmingyuan was done for the same reason that the Allies bombed Dresden to rubble during the Second World War. Dresden had no military value but it was the spiritual and cultural heart of Germany, its destruction meant "to open a wound in the German

soul that would never heal". For precisely the same reason, the American 'deep state' was savagely determined to drop the first atomic bomb on Kyoto, also the heart and soul of Japanese culture. Kyoto was protected by Providence, with heavy overcasts of clouds that preventing the bombers from locating it with sufficient accuracy, forcing them to their alternates of Hiroshima and Nagasaki.

But in terms of the destruction of a literary recording of culture and invention, there was perhaps an even greater crime against the history of Chinese knowledge – the destruction of the library and the Yongle Dadian at the Hanlin Academy. (6) That encyclopedia of 22,000 volumes written by more than 2,000 scholars over many years, contained much of the total of 5,000 years of Chinese knowledge, invention and thought. The British carried all those books outdoors, poured fuel on them, and burnt the entire collection to ashes. Only God knows what was lost in this tragic destruction, ordered by the same drug dealers as punishment for refusing opium, meant to break China's will by striking at the very heart of the nation's culture in the wanton destruction of something of such inestimable value as to leave an open wound that would never heal. Only about 150 volumes survived the incineration, 40 those residing today in the US Library of Congress, which has no intention of returning them to China.

Darwinism at its Finest

Westerners today justify their unacknowledged appropriation of Chinese

knowledge and subsequent claims to ownership on some variant of the proposition that the Chinese invented those things, but never developed or capitalised on them, but the claim is invalid self-serving nonsense since my invention is mine whether or not I choose to develop it. The claim is also untrue.

When the Chinese invented paper and printing, books became widespread throughout China, as with the weaving of cloth and development of textiles. China employed its inventions in unlimited ways for the benefit of Chinese society. What they did not do is file patents, convert everything to privatelyowned IP, and transfer their ingenuity from social benefit to private profit.

Criticisms of China's use of its inventions are not so much negating a lack of application but the absence of commercialisation, these Western justifications implying that any nation not immediately striving for profit maximisation of its discoveries is morally negligent, the theft of those discoveries then justified by those who would use them more properly. This is the bank robber taking the high moral ground by claiming he put the money to better use than the bank would have done.

To have foregone private commercialisation was neither a character flaw nor a behavioral fault, but a reflection of the pluralistic and socialistic nature of the Chinese people, the same reason that even today China's patent and IP laws and regulations are so much less aggressive than those of the US. Put simply, China has never been as capitalistic or as individualistic as the West. It is part of the greatness of the Chinese nation that this immense population

engaged in millennia of stunning research, discovery and invention and freely distributed those fruits throughout the nation. This emphasis on the greater good and overall benefit to society rather than individual profit, is fundamental to the natural humanity of the Chinese people, and cannot be permitted to be destroyed by the sociopathic Western model so forcefully promoted today on the basis of a fictitious moral superiority.

The West chooses to ignore the fact that the 200-year hiatus in China's innovation was due almost entirely to their own military invasions, when the West was ravaging and destroying the nation. China's development, social progress, and invention, ceased only from the invasions by both the Americans and Europeans, and most especially with the Jews' vast program of trafficking in opium in China.

Perhaps of more direct interest is that China's lag in current technology is, more than anything else, an unfortunate accident of fate that occurred during a blip in time. After Mao evicted all the foreigners and China shook off the effects of 200 years of foreign interference and plundering to begin the transition to an industrialised economy, this was precisely when the world of electronics and communication exploded. It was during that brief period of a couple of decades that computers, the Internet, mobile phones and so much more, were conceived and patented by the West. Virtually the entire process passed China by, because during that brief period the nation was entirely enveloped in the fundamentals of its economic and

social revolution, and in no position to participate. China's lack of patents and IP in the field of electronics today is due neither to Western superiority nor Chinese lack of innovation, but to Western aggression. The accumulation of American and European patents was in no way due to Western supremacy in innovation but to the absence of the Chinese.

The Present and the Future

China's Inventiveness has not ended. With China recovering and once again taking its rightful place in the world, it is continuing where it left off 200 years ago. Ignoring the historical setback, Chinese companies are simply by-passing the earlier stages of innovation by foreign firms and proceeding to subsequent stages where the field is open and foreign patents have not precluded innovation and development.

If we examine the fields where China lags today in terms of patents and IP, it is primarily in those areas of science that progressed during that brief period where China was unable to participate. As soon as China found its footing, innovation continued unabated as it had for thousands of years. China missed the computer and Smartphone patents, but was perfectly timed for the solar panel revolution and quickly emerged as the world leader – at which point the US imposed tariffs of 300% on Chinese solar panels in an attempt not so much to kill China's export sales but to prevent the accumulation of funds for further R&D. In any area not pre-empted by IP restriction, China's innovation has soared – usually to world leadership.

Despite US accusations of China copying foreign technology, China's hightechnology achievements were entirely home-grown because the US has been so determined to hinder China's rise that by 1950 it engineered an international embargo on all scientific knowledge and on almost all useful products and processes to China, including legislation that Chinese scientists cannot be invited to, or participate in, American scientific forums, while bullying other Western nations into doing the same. In October of 2019, all Chinese scientists and space technology companies were denied visas to attend the weeklong International Astronautical Congress in Washington, far from the first time such has occurred.

We hear much in the Western media about China demanding technology transfers as a condition of corporate residence in China, but this is mostly propaganda. No doubt expectations for technology and knowhow transfer do occur, since China doesn't want to spend the rest of its life making toasters and running shoes but, since entry to the Chinese market is a gift of billions in profits, it is perfectly sensible to attach a price to it. However, one must keep in mind that no foreign company is conducting cutting-edge commercial or sensitive military research, or manufacturing quantum computers and hypersonic missiles in China. Any technology actually available for transfer would be almost entirely in consumer goods, and hardly constitute great value or threats to US 'national security'. And, in virtually all of the cutting-edge fields and industries such as quantum computing, 5-G

telecom or solar energy, China has already surpassed the US.

A Brief List of Recent Chinese Innovation

In 2015, Chinese engineers announced the world's first quantum communications network, a 2,000 kilometer system linking Beijing and Shanghai with data transmission encoded by quantum key distribution. In August of 2016 China launched the world's first quantum communications satellite, and succeeded in test communication with the country's existing ground stations. In September of 2016, Chinese scientists achieved the world's first quantum teleportation between independent sources, delivering quantum information enciphered in photons between two locations.

In 2014, researchers at Nankai University in Tianjin developed a car with a working brain-control unit, with sensors that capture brain signals permitting humans to control the automobile with their minds. In 2016 China launched a fully-operational space lab to conduct the first ever brain-machine interaction experiments in space. Chinese scientists believe brain-computer interaction will eventually be the highest form of human-machine communication, having developed this process much farther than any Western nation and holding nearly 100 patents.

In 2015, high school students from Tianjin won an International gold medal for the creation of a microbe biological battery. Such attempts in the past have failed due to poor performance and limited usefulness, but these students conceived the idea of combining several types of bacteria into one

biological power cell, with each bacterium having specialised responsibilities based on its own unique functions. Their tiny multi-bacteria cell reached over 520 mV, and lasted over 80 hours. Scaled up, their biological battery was able to generate as much power as a lithium battery, with a much longer life and producing no pollution. These are Chinese high school kids.

In 2015 Chinese scientists succeeded in modifying a human embryo to permit the changes to persist through future generations, something that had never been accomplished before, to alter human DNA for removal of dangerous or undesired genes from future generations. Chinese researchers are developing the technology and processes to make 3D-printed skin a reality, custom-made skin for burn patients, printed according to their wounds. The country leads the world in cat-scan technology, in DNA mapping and synthesising, and many medical fields such as laser eye surgery and cornea transplants.

In May of 2019, a Chinese start-up launched a revolutionary AI chip with the computing power of eight NVIDIA P4 servers but up to five times faster, with half the size and 20% of the energy consumption, and costing 50% less to manufacture. Shanghai's Fudan University developed a transistor based on two-dimensional molybdc sulfide, meaning computing and data storage happen together in a single cell, perhaps eliminating silicon-based chips which are at their limit. DJI Technology, founded by a Chinese university student, has become in only a few years the global market leader in small

consumer drones, and already attracting American sanctions for being too successful in an area the US wants to control. The country produces nearly 40% of the world's robots, with vastly improved core technologies, and is the world leader in 5-G technology. Chinese engineers created a supercomputer seven times faster than America's Oak Ridge installation, the first in the world to achieve speeds beyond 100 PetaFlops, powered by a Chinese-developed multi-core CPU and Chinese software, while displacing the US with the most supercomputers in the top 500. Upon the revelation of China's super-fast supercomputer, authorities reported the NSA had launched hundreds of thousands of hacking attacks, looking to steal the technology for China's new microprocessors.

China's megaproject engineering skills are already legendary, with the longest sea bridges, the longest tunnels, the largest deep-water ports. China has built the world's longest and highest glass bridge in Zhangjiajie, hanging between two steep cliffs 300 meters above the ground, and which set 10 world records spanning its design and construction. The Three Gorges Dam is the world's largest, with 5-tier ship locks which can contain the world's largest ships, and also a shiplift for smaller vessels which is the largest and most sophisticated in the world. China has formulated plans to build an electron collider, four times as long (100 Kms) and operating at more than seven times the energy capacity of the European CERN. In 2015, Chinese scientists completed the 500-meter radio telescope, by far the

largest in the world with more than ten times the area of the American installation in Puerto Rico.

In 2014, architects in Amsterdam began work on what was to be the world's first completely 3D-printed house, a costly enterprise requiring three years. At exactly the same time in Shanghai, a Chinese company completed ten 3Dprinted houses in less than a day, at a cost of less than \$5,000 each, using recycled construction and industrial scrap as the 'ink'. I have seen these homes; large, elegant, multi-story European-styled structures, and so sturdy they can withstand earthquakes up to level 8 on the Richter scale.

We know about China's fabulous high-speed trains, but few outside China are aware of the intense high quality of the HSR network, built with the highest standards in the modern world, including stability. When traveling by train I sometimes place a coin on its edge on the windowsill, and I have video of the coin remaining stable for four or five minutes before it finally falls over – and this is at 300 Kms per hour. Shanghai has a high-speed Maglev train (430 Kms/hr), while many cities have low-speed Maglevs (200 Kms/hr), and Chinese engineers are ready to produce commercially a 600 Km/hr Maglev. The same pace of development is true of the nation's urban subway systems. I have lost the source for these figures, but the city of London needed 147 years to build 408 Kms. of subway lines, New York City 106 years for 370 Kms., Paris 110 years for 215 Kms, while Shanghai needed only 20 years to build 500 Kms.

It has escaped attention that these achievements were not sudden, but

developed from a deliberate plan in execution for 30 years, though it is only recently that many of these efforts are bearing fruit. More importantly, China accomplished this from a third-world industrial base while under a total Western embargo on technology transfer. Chinese scientists have developed nuclear energy plants, put men into space, photographed the entire surface of the moon, built a space station, designed and launched a private GPS system. We have Chinese-designed and built deep-sea submersibles, and the country is rapidly developing its own aircraft industry. Today, with its science and technological base so much more advanced, and with education spending increasing at nearly 10% per year, and very high R&D expenditures, invention and innovation can only increase.

A Closing Note

One of the most persistent myths propagated about China, a claim without a shred of supporting evidence, is that Chinese lack creativity and innovation due to flaws in their educational system. We have seen the accusations hundreds of times: China's educational system teaches only rote memory while stifling innovation, the Chinese unable to conceptualise or innovate, knowing only how to achieve high test scores but not how to think. Here is Carly Fiorina speaking, the former CEO of H-P: "I've been doing business in China for decades, and I will tell you that yeah, the Chinese can take a test, but what they can't do is innovate. They're not terribly imaginative. They're not entrepreneurial. They don't innovate. That's why they're stealing our intellectual property ... innovation and entrepreneurship are not their strong

suits. Their society, as well as their educational system, is too homogenized and controlled to encourage imagination ..." (7) The claim is complete rubbish for more reasons than I have room to account here.

In 2015, Eva Dou reported in the Wall Street Journal of a study by McKinsey who claimed that China had made all the "easy" innovations, like making products better and cheaper, but that "the country has limited success stories in 'more challenging' types of innovation that rely on scientific or engineering breakthroughs." McKinsey's conclusions are not supported by the evidence listed here. (8)